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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/888,977	06/25/2001	Darren K. Rogers	1475(Touchstone)	9561

7590 10/14/2003
McGuire Woods LLP
1750 Tysons Boulevard
Suite 1800
McLean, VA 22102

EXAMINER	
WILLS, MONIQUE M	
ART UNIT	PAPER NUMBER
1746	

DATE MAILED: 10/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/888,977

Applicant(s)

ROGERS ET AL.

Examiner

Wills M Monique

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

Claim Objections

Claims 16, 22 & 24 are objected to because of the following informalities: the instant claims recite "coal-based foam" and there is a lack of antecedent basis for said recitation. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 14-15 are rejected under 35 U.S.C. 102(e) as being anticipated by
Reznek et al. U.S. Pub. 2002/0028385.

Reznek teaches improving a conventional fuel cell by pyrolyzing carbon (par. 44) to produce a carbon foam for use as fuel cell electrodes (par. 36). All fuel cells inherently contain anodes, cathodes and appropriate conductor for supply of electrical current in order to generate electricity.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 14 & 22 are rejected under 35 U.S.C. 102(e) as being anticipated by Droege al. U.S. Patent 5,954,084.

Droege teaches a carbon foam having a meso-pore sizes of 2 to 500 microns (col. 2, lines 25-35). The carbon foam may be used as a fuel cell electrode (col. 4, lines 35-50). All fuel cells inherently contain anodes, cathodes and appropriate conductor for supply of electrical current in order to generate electricity.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 & 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reznek et al. U.S. Pub. 2002/0028385 in view of Droege U.S. Patent 5,945,084.

Reznek teaches pyrolyzing coal (par. 44) to make a carbon foam aerogel (par. 3) for use as fuel cell electrodes (par. 36).

The reference does not expressly disclose that the fuel cell contains a polymer electrolyte membrane (PEM fuel cell) or the product by process limitations of claim 27.

Droege teaches the use of carbon foams electrode material in fuel cells primarily due to there high electrical conductivity.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ carbon foam as an electrode in a PEM fuel cell, because Droege teaches that such foam may be used in any fuel cell, including PEMs, due to their high electrical conductivity.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 2-13, 16-21 & 23 -27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stiller et al. U.S. Patent 5,888,469 in view of Droege U.S. Patent 5,945,084.

Stiller teaches a method of making an isotropic carbon foam by employing raw bituminous coal (abstract). Bituminous coal may be used to produce carbon foam of high compressive strength (abstract). The carbon foam product has a compressive strength in excess of about 600lb/in² (col. 4, lines 10-15). The coal is graphitized at a temperature of at least 2600°C (col. 4, lines 50-60). The bituminous coal is proved in a size of about -60 to -200 mesh and preferably, about -60 to -80 mesh (col. 3, lines 60-68). The thermal conductivity of the foam may be altered depending upon the end use (col. 6, lines 40-50). When using as a thermal insulator the carbon foam is electrically conductive (col. 6, lines 30-35). The isotropic foam is not a high thermal conductor (col. 6, lines 40-50). The density of the graphitized foam is about 0.2 to 2 g/cc and preferably about 0.2 to 0.4 g/cc (col. 6, lines 15-20). The bubble or pore sizes of the foam will all be equal and control of size may be effected by controlling the amount of volatiles in the asphaltenes, as well as the externally applied pressure through ballast tank 33 (col. 5, lines 50-60).

The reference does not expressly disclose a thermal conductivity of below about 1 W/m²°K, a swell index of 3 to 5, the bituminous coal having a Gieseler plasticity above 500DDPM, a pore size below about 2000 microns or the product-by-process limitation of claims 13 & 27. The reference is silent to employing the carbon foam in a fuel cell electrode.

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Droege teaches that it is conventional to employ carbon foam having a pore size of 0.002 to 0.05 microns to increase the surface area (col. 2, lines 25-35). The reference also teaches that it is conventional to employ carbon foam as fuel cell electrodes because of their high electrical conductivity (col. 4, lines 35-45).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the carbon foam of Stiller as a fuel cell electrode because of said foams electrical conductivity.

With regard to the pore sizes, the skilled artisan would have been motivated to employ such pores in order to increase the surface area thus utilization of the fuel cell electrode as taught by Droege.

As to the thermal conductivity, Stiller teaches that the thermal conductivity can be controlled depending on usage. When employed for high electrical conductivity, the thermal conductivity must be made sufficiently low as it is inversely proportional to the electrical conductivity as taught by Stiller (col. 6, lines 50-60). Further, such modification would have been obvious, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233. As taught by Stiller, the thermal conductivity directly effects the electrical conductivity of the carbon foam material.

With regard to the product by process limitations of claims 13 & 27, the carbon foam taught by Reznick appears to be the same as the subject invention, thus in the

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event that any difference can be show, such difference would have been obvious to one of ordinary skill in the art as a routine modification of the product in the absence of a showing of unexpected results; see also In re Thorpe, 227 USPQ 964 (Fed. Cir. 1985).

Regarding the plasticity of the coal and swell index of the carbon foam, it would have been obvious to one having ordinary skill to select materials of such characteristics, since it has been held to be within the general skill of a worker in the art to select a know material on the basis of its suitability for the intended use a matter of obvious design choice. In re Leshin, 125 USPQ 416. Further, Stiller teaches that several characteristics of the carbon foam may be altered through routine experimentation and selection of materials including the pore size, density and thermal conductivity. Therefore, it would be reasonable to expect the skilled artisan to employ starting materials have suitable characteristics to optimize the physical nature of the foam.

Conclusions

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Monique Wills whose telephone number is (703) 305-0073. The Examiner can normally be reached on Monday-Friday from 8:30am to 5:00 pm.

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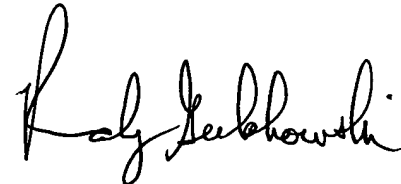
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

If attempts to reach Examiner by telephone are unsuccessful, the Examiner's supervisor, Randy Gulakowski, may be reached at 703-308-4333.

The unofficial fax number is (703) 305-3599. The Official fax number for non-final amendments is 703-872-9310. The Official fax number for after final amendments is 703-872-9311.

Mw

09/01/03

A handwritten signature in black ink, appearing to read "Randy Gulakowski".

RANDY GULAKOWSKI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700